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(54) Title of the invention: Network managing system

(57) Abstract:

Problem to be solved: To suppress the increase of traffic for network management and the increase of processing load of a network managing device due to the increase of network equipment.

Solution: When a request packet receiving part 2a receives a request packet and performs semantic analysis, an operating state setting part 2b sets the title of managing data to be transmitted to a network managing device 1 and the intervals of transmission based on the contents of

semantic analysis at the request packet receiving part 2a. Then, time is measured by a time monitoring part 2d, and when the time of set transmission interval comes, a managing data possessing part 2e possesses the amount of received data. Then, a Trap packet transmitting part 2f transmits a Trap packet to the network managing device 1 while including the received data amount possessed by the managing data possessing part 2e in it.

[Claims]

[Claim 1] Transmission of managing data, a request packet to demand, the contents of a Trap packet receiving part that receives a Trap packet which informs that a response packet receiving part that receives a response packet which is the reply to a request packet transmitting part which transmits and this request packet and a predetermined phenomenon occurred and received managing data. A network managing device that has an operating state indicator to display, a response packet transmitting part that transmits a response packet which performs a response to a request packet receiving part that receives a request packet transmitted from the mentioned above request packet transmitting part and this request packet and the mentioned above Trap packet. A network managing system includes network equipment that has a Trap packet transmitting part that transmits, and using SNMP as a management protocol, adding a performance monitor conditioning part that sets up an interval which transmits classification of managing data

and managing data which are received from network equipment to the mentioned above network managing device and to the mentioned above network equipment, an operating state setting part that detects the mentioned above managing data name and transmission interval data which are contained in a request packet received in the mentioned above request packet receiving part and sets up an operating state, while adding a time monitoring part that measures an interval that transmits managing data detected by this operating state setting part and including the mentioned above managing data in the mentioned above Trap packet, a network managing system characterized by that the mentioned above Trap packet transmitting part transmits a Trap packet based on a measurement value of the mentioned above time monitoring part.

[Claim 2] The mentioned above performance monitor conditioning part sets up transmission frequency of a Trap packet from the mentioned above network equipment, adding a counter part that measures transmission frequency of a Trap packet to the mentioned above network equipment and the mentioned above network equipment, the network managing system according to claim 1 characterized by that only transmission frequency set up by the mentioned above operating state setting part transmits a Trap packet from the mentioned above Trap packet transmitting part.

[Claim 3] The mentioned above performance monitor conditioning part sets up sending end time of a Trap packet from the mentioned above network equipment, and the mentioned above time monitoring part, the network managing system according to claim 1 transmitting a Trap packet from the mentioned above Trap packet transmitting part until the mentioned above sending end time set up by the mentioned above operating state setting part passed.

[Claim 4] Transmission of managing data, a request packet to demand, the contents of a Trap packet receiving part that receives a Trap packet which informs that a response packet receiving part that receives a response packet which is the reply to a request packet transmitting part which transmits and this request packet and a predetermined phenomenon occurred and received managing data. A network managing device that has an operating state indicator to display, a response packet transmitting part that transmits a response packet which performs a response to a request packet receiving part which receives a request packet transmitted from the mentioned above request packet transmitting part and this request packet and the mentioned above Trap packet. A network managing system includes network equipment that has a Trap packet transmitting part which transmits and using SNMP as a management protocol, a performance monitor conditioning part that sets classification of managing data and transmission frequency of a Trap packet that are received from network equipment and sending end time of a Trap

packet as the mentioned above network managing device is added, an operating state setting part that detects the mentioned above managing data name included in the mentioned above network equipment at a request packet received in the mentioned above request packet receiving part, the mentioned above transmission frequency, and the mentioned above sending end time, and sets up an operating state, adding a time monitoring part that measures sending end time detected by this operating state setting part and a counter part that measures transmission frequency detected by the mentioned above operating state setting part and the mentioned above operating state setting part, a network managing system characterized by detecting a transmission interval of a Trap packet from the mentioned above sending end time and transmission frequency and the mentioned above time monitoring part transmits a Trap packet from the mentioned above Trap packet transmitting part based on the mentioned above transmission interval and counted value of the mentioned above counter part.

[Detailed description of the invention]
[0001]
[Field of the invention] This invention relates to the network managing system that manages the apparatus connected to the network using SNMP.

[0002]

[Description of the prior art] In recent years, with the increase in the number of possession of a computer, and development of the use art of a computer network, many computers come to be connected to a network and large scale network systems are progressing.

[0003] Various network practical use functions (service) are provided on the network by development of network use art. Since a network control item also increases with the increase in service, the load of a network managing device increases. Then, in order to reduce the load of a network managing device, a plurality of network equipment holds managing data and the decentralization of managing data that manages by these network equipment assigning is considered.

[0004] In order to perform network management, SNMP is widely used as a protocol that exchanges data between a manager and an agent.

[0005] In the network managing system using SNMP as a protocol, to the Get request packet or Get-Next request packet to which collection of managing data was transmitted from the network managing device, when network equipment replies a Get response packet, it is carried out.

[0006]

[Problems to be solved by the invention] However, in the network managing system of the above composition, when a network managing device collects managing data from network equipment for every constant interval, a network managing device transmits a Get request packet for every constant interval, network equipment will reply a Get response packet to it, and two packets will be transmitted on a network for one collection of managing data. Thus, the traffic for network management not only increases, but the problem that the processing load of a network managing device will increase arises as the network equipment that exists in a network increases.

[0007] This invention is accomplished in view of the mentioned above point. It is in the purpose controlling the increase of the traffic for network management and the increase of the processing load of a network managing device accompanying the increase and providing the network managing system that performs management using SNMP that can perform efficient managing data collection.

[0008]

[Means for solving the problem] The invention according to claim 1, transmission of managing data, a request packet to demand, the contents of a Trap packet receiving part that receives a Trap packet that informs that a response packet receiving part which receives a response packet which is the reply to a request packet transmitting part that transmits and this request packet, and a predetermined phenomenon

occurred and received managing data. A network managing device that has an operating state indicator to display, a response packet transmitting part that transmits a response packet which performs a response to a request packet receiving part that receives a request packet transmitted from the mentioned above request packet transmitting part and this request packet and the mentioned above Trap packet. A network managing system includes network equipment that has a Trap packet transmitting part that transmits, and using SNMP as a management protocol, adding a performance monitor conditioning part that sets up an interval which transmits classification of managing data and managing data that are received from network equipment to the mentioned above network managing device, and to the mentioned above network equipment. An operating state setting part that detects the mentioned above managing data name and transmission interval data that are contained in a request packet received in the mentioned above request packet receiving part, and sets up an operating state, while adding a time monitoring part that measures an interval which transmits managing data detected by this operating state setting part and including the mentioned above managing data in the mentioned above Trap packet, the mentioned above Trap packet transmitting part transmitted a Trap packet based on a measurement value of the mentioned above time monitoring part.

[0009] In the network managing system according to claim 1, the invention according to claim 2, the mentioned above performance monitor conditioning part, transmission frequency of a Trap packet from the mentioned above network equipment is set up, a counter part that measures transmission frequency of a Trap packet is added to the mentioned above network equipment, and only transmission frequency to which the mentioned above network equipment was set by the mentioned above operating state setting part transmitted a Trap packet from the mentioned above Trap packet transmitting part.

[0010] In the network managing system according to claim 1, the invention according to claim 3, the mentioned above performance monitor conditioning part, sending end time of a Trap packet from the mentioned above network equipment was set up and the mentioned above time monitoring part transmitted a Trap packet from the mentioned above Trap packet transmitting part until the mentioned above sending end time set up by the mentioned above operating state setting part passed.

[0011] The invention according to claim 4, transmission of managing data, a request packet to demand, the contents of a Trap packet receiving part that receives a Trap packet that informs that a response packet receiving part that receives a response packet which is the reply to a request packet transmitting part which transmits and this request packet and a predetermined phenomenon occurred and received managing data. A network managing device that has an

operating state indicator to display, a response packet transmitting part that transmits a response packet that performs a response to a request packet receiving part that receives a request packet transmitted from the mentioned above request packet transmitting part and this request packet and the mentioned above Trap packet. A network managing system includes network equipment that has a Trap packet transmitting part which transmits, and using SNMP as a management protocol, a performance monitor conditioning part that sets classification of managing data and transmission frequency of a Trap packet that are received from network equipment, and sending end time of a Trap packet as the mentioned above network managing device is added, an operating state setting part that detects the mentioned above managing data name included in the mentioned above network equipment at a request packet received in the mentioned above request packet receiving part, the mentioned above transmission frequency, and the mentioned above sending end time, and sets up an operating state, adding a time monitoring part that measures sending end time detected by this operating state setting part and a counter part that measures transmission frequency detected by the mentioned above operating state setting part and the mentioned above operating state setting part, detecting a transmission interval of a Trap packet from the mentioned above sending end time and transmission frequency, the mentioned above time monitoring part transmitted a Trap packet from the mentioned above Trap

packet transmitting part based on the mentioned above transmission interval and counted value of the mentioned above counter part.

[0012]

[Embodiment of the invention]

= Embodiment 1 =

Below one embodiment of this invention is described based on a drawing. Drawing 1 is an entire configuration drawing showing the network managing system according to one embodiment of this invention. The network managing system includes the network managing device 1 that has an SNMP manager function, and a plurality of network equipment 2 that has an SNMP agent function. The network managing device 1 has the performance monitor conditioning part 1a, the request packet transmitting part 1b, the response packet receiving part 1c, the Trap packet receiving part 1d, and the operating state indicator 1e. The network equipment 2 has the request packet receiving part 2a, operating state setting part 2b, the response packet transmitting part 2c, the time monitoring part 2d, the managing data possessing part 2e and the Trap packet transmitting part 2f.

[0013] The performance monitor conditioning part 1a is for a network administrator to operate the network managing device 1 and can set up the possessing interval of a managing data name and managing data in this embodiment.

The request packet transmitting part 1b generates the request packet (a Get request packet, a Get-Next request packet, a Set request packet) of SNMP, and transmits to the network equipment 2 of an administration object. The response packet receiving part 1c receives the Get response packet of SNMP and conducts the semantic analysis of the Get response packet which received. The Trap packet receiving part 1d receives the Trap packet of SNMP, and conducts the semantic analysis of the Trap packet which received. The operating state indicator 1e displays the contents by which the semantic analysis was conducted in the response packet receiving part 1c and the Trap packet receiving part 1d, and has come to be able to carry out graphical representation of the digital data by which the semantic analysis was conducted in this embodiment.

[0014] The request packet receiving part 2a receives the request packet (a Get request packet, a Get-Next request packet, a Set request packet) of SNMP and conducts the semantic analysis of the request packet which received. Operating state setting part 2b sets up an operating state based on the contents of the semantic analysis in the request packet receiving part 2a. The response packet transmitting part 2c generates the Get response packet of SNMP, and transmits to the network managing device 1. The time monitoring part 2d performs a certain operation for every constant interval. The managing data possessing part 2e calculates the present value of managing data from a managing data name. The Trap packet transmitting part 2f

generates the Trap packet of SNMP and transmits to the network managing device 1.

[0015] Next, operation of this embodiment is explained. In this embodiment, a network administrator operates the network managing device 1 and the case where the data volume that a certain network equipment 2 received is displayed using the graph which shows the change in every 10 seconds is explained. Drawing 2 is a mimetic diagram showing operation of the network managing system according to this embodiment. In the network managing device 1, the performance monitor conditioning part 1a receives a managing data name (the amount of received data) and a transmission interval (in this embodiment, it is 10 seconds) from a network administrator, and the Set request packet having contained the value as which the request packet transmitting part 1b was inputted is transmitted.

[0016] If the request packet receiving part 2a receives a Set request packet and the network equipment 2 conducts a semantic analysis, operating state setting part 2b will set up a managing data name and a transmission interval based on the contents of the semantic analysis in the request packet receiving part 2a. After setting out of an operating state is completed in operating state setting part 2b, the response packet transmitting part 2c transmits the Get response packet for informing the end of setting out to the network managing device 1.

[0017] The network managing device 1 will display the graph with which initial setting of the operating state indicator 1e was carried out, if a Get response packet is received in the response packet receiving part 1c.

[0018] Whenever the network equipment 2 detects time progress of 10 seconds in the time monitoring part 2d, the managing data possessing part 2e acquires the amount of received data, and the Trap packet transmitting part 2f transmits the Trap packet including the value of the amount of received data acquired by the managing data possessing part 2e to the network managing device 1. Since not the response packet to a request packet but the Trap packet is used at this time in order to transmit a managing data value, the packet number transmitted on a network can be managed with a half.

[0019] The network managing device 1 plots the operating state indicator 1e on the graph currently displayed in the value of the amount of received data included in a Trap packet, whenever the Trap packet receiving part 1d receives Trap packet from the network equipment 2.

[0020] In the operating state indicator 1e, the plot of the value of the amount of received data to a graph top, since it is not carried out unless a Trap packet is received, when the plot of a value has stopped by the operating state indicator 1e, it can be judged that a certain obstacle is encountered in the network equipment 2.

[0021] Thus, in order to use a Trap packet in this embodiment for transmission of managing data, compared with the case where the Get response packet to the Get request packet from the network managing device 1 is used, traffic volume for managing data collection can be made into a half. Since it becomes unnecessary for the network managing device 1 to transmit a Get request packet each time for managing data collection, they can decrease in number a processing load. The network managing device 1 is the existence of the Trap packet from the network equipment 2 and since it can judge the operating state of the network equipment 2, it becomes unnecessary to transmit another packet for operating state surveillance.

[0022] As shown on drawing 3, in the performance monitor conditioning part 1a, setting up sending end time further and in the time monitoring part 2d, if it is made to suspend operation of the time monitoring part 2d when the time after starting transmission of a Trap packet from the Trap packet transmitting part 2f is measured and sending end time passes, it becomes unnecessary to transmit the Set request packet that requires the transmission stop of a Trap packet and the Get response packet to a Set request packet, and the traffic volume for management can be decreased.

[0023] = Embodiment 2=

Drawing 4 is an entire configuration drawing showing the network managing system according to other embodiments of this invention. Identical codes are attached about the part which performs the same operation as the network

managing device 1 and the network equipment 2 that are shown on drawing 1 and explanation is omitted. In addition to setting out of the managing data name of Embodiment 1, and the possessing interval of managing data, the performance monitor conditioning part 1a sets up the transmission frequency of a Trap packet. The counter part 2g measure the transmitting remaining number of the Trap packet which the network equipment 2 transmits, and based on the transmission frequency data detected with operating state setting part 2b, in this embodiment, a Trap packet will be transmitted, if the value that the counter part 2g holds decreases and it is set to 0 as a Trap packet is transmitted from the Trap packet transmitting part 2f.

[0024] Next, operation of this embodiment is explained based on a drawing. In this embodiment, a network administrator operates the network managing device 1, and the case where collect the data volume that a certain network equipment 2 received 4 times as data in which the change in every 10 seconds is shown, and it displays using a graph is explained. Drawing 5 is a mimetic diagram showing operation of the network managing system according to this embodiment. In the network managing device 1, the performance monitor conditioning part 1a From a network administrator to a managing data name (the amount of received data). A transmission interval (in this embodiment, it is 10 seconds) and transmission frequency (in this embodiment, it is 4 times) are received as an input value and the Set request packet having contained

the value as which the request packet transmitting part 1b was inputted is transmitted.

[0025] If the request packet 2a receives a Set request packet and the network equipment 2 conducts a semantic analysis, operating state setting part 2b will set up a managing data name, a transmission interval and transmission frequency based on the contents of the semantic analysis in the request packet receiving part 2a. After setting out of an operating state is completed in operating state setting part 2b, the response packet transmitting part 2c transmits the Get response packet for informing the end of setting out to the network managing device 1.

[0026] The network managing device 1 will display the graph with which initial setting of the operating state indicator 1e was carried out, if a Get response packet is received in the response packet receiving part 1c.

[0027] Whenever the network equipment 2 detects time progress of 10 seconds in the time monitoring part 2d, the managing data possessing part 2e acquires the amount of received data, and the Trap packet transmitting part 2f transmits the Trap packet including the value of the amount of received data acquired by the managing data possessing part 2e to the network managing device 1. The counting part 2g decreases counted value every 1 from counted value =4, whenever a Trap packet is transmitted from the Trap packet transmitting part 2f. And the time monitoring part 2d investigates the counted value of the counter part 2g, when a Trap packet is transmitted from the Trap packet

transmitting part 2f, when counted value is 0, it suspends operation of the time monitoring part 2d and it does not transmit a Trap packet next.

[0028] The network managing device 1 plots the operating state indicator 1e on the graph currently displayed in the value of the amount of received data contained in a Trap packet, whenever the Trap packet receiving part 1d receives Trap packet from the network equipment 2.

[0029] Thus, in order to suspend operation of the operating state indicator 1e in this embodiment, it becomes unnecessary to transmit the Set request packet that requires the transmission stop of a Trap packet and the Get response packet to a Set request packet, and the traffic volume for management can be decreased.

[0030] As shown on drawing 6, in the performance monitor conditioning part 1a of the mentioned above embodiment, set up sending end time further, and in operating state setting part 2b, if it asks for the transmission interval of a Trap packet from transmission frequency data and sending end temporal data, the counted value of the counter part 2g is set to 0 and transmission of a Trap packet will be ended, it becomes unnecessary to transmit the Set request packet that requires the transmission stop of a Trap packet and the Get response packet to a Set request packet and the traffic volume for management can be decreased.

[0031]

[Effect of the invention] The invention according to claim 1, transmission of managing data, the request packet to demand, the contents of the Trap packet receiving part that receives the Trap packet that informs that the response packet receiving part that receives the response packet which is the reply to the request packet transmitting part and request packet which transmit, and the predetermined phenomenon occurred and the received managing data. A network managing device that has an operating state indicator to display, the request packet transmitted from the request packet transmitting part. It includes network equipment that has a response packet transmitting part which transmits the response packet that performs the response to the request packet receiving part and request packet which receive and a Trap packet transmitting part which transmits a Trap packet, adding the performance monitor conditioning part that sets up the interval which transmits the classification of managing data and managing data that are received from network equipment to a network managing device and to network equipment in the network managing system using SNMP as a management protocol. The operating state setting part that detects the managing data name and transmission interval data which are contained in the request packet received in the request packet receiving part and sets up an operating state, while adding the time monitoring part that measures the interval that transmits the managing data detected by the operating

state setting part and including managing data in a Trap packet, a Trap packet transmitting part, since it is trying to transmit a Trap packet based on the measurement value of a time monitoring part, it compares with the case where the response packet to the request packet from a network managing device is used, can make traffic volume for managing data collection into a half and a network managing device, since it becomes unnecessary to transmit a request packet each time for managing data collection, can decrease a processing load and the increase of the traffic for network management and the increase of the processing load of a network managing device accompanying the increase in network equipment are controlled, the network managing system that performs management using SNMP which can perform efficient managing data collection was able to be provided.

[0032] In the network managing system according to claim 1, the invention according to claim 2, a performance monitor conditioning part, setting up the transmission frequency of the Trap packet from network equipment, add the counter part that measures the transmission frequency of a Trap packet to network equipment, and network equipment, since only the transmission frequency set up by the operating state setting part transmitted the Trap packet from the Trap packet transmitting part, it is not necessary to use the Set request packet that requires the transmission stop of a Trap packet and the Get response packet to a Set

request packet and the traffic volume for managing data collection can be decreased.

[0033] In the network managing system according to claim 1, the invention according to claim 3, a performance monitor conditioning part, setting up the sending end time of the Trap packet from network equipment and a time monitoring part, since the Trap packet was transmitted from the Trap packet transmitting part until the sending end time set up by the operating state setting part passed, managing data collection within fixed time can be performed without using the Set request packet that requires the transmission stop of a Trap packet and the Get response packet to a Set request packet, and increasing traffic volume, when sending end time passes.

[0034] The invention according to claim 4, transmission of managing data, the request packet to demand, the contents of the Trap packet receiving part that receives the Trap packet which informs that the response packet receiving part which receives the response packet that is the reply to the request packet transmitting part and request packet which transmit, and the predetermined phenomenon occurred and the received managing data. A network managing device that has an operating state indicator to display, the request packet transmitted from the request packet transmitting part. It includes network equipment that has a response packet transmitting part that transmits the response packet which performs the response to the request packet receiving part and request packet which receive and

a Trap packet transmitting part that transmits a Trap packet, the performance monitor conditioning part that sets up the classification of managing data and the transmission frequency of a Trap packet that are received from network equipment to a network managing device and the sending end time of a Trap packet in the network managing system using SNMP as a management protocol is added, the operating state setting part that detects the managing data name, transmission frequency and sending end time which are contained in network equipment at the request packet received in the request packet receiving part, and sets up an operating state, adding the time monitoring part that measures the sending end time detected by the operating state setting part and the counter part that measures the transmission frequency detected by the operating state setting par, and an operating state setting part, detecting the transmission interval of a Trap packet from sending end time and transmission frequency and a time monitoring part, since the Trap packet was transmitted from the Trap packet transmitting part based on a transmission interval and the counted value of a counter part, managing data collection within fixed time can be performed without using the Set request packet that requires the transmission stop of a Trap packet, and the Get response packet to a Set request packet, and increasing traffic volume, when sending end time passes.

[Brief description of the drawings]

[Drawing 1] is an entire configuration drawing showing the network managing system according to one embodiment of this invention.

[Drawing 2] is a mimetic diagram showing operation of the network managing system according to this embodiment.

[Drawing 3] is a mimetic diagram showing operation of the network managing system according to other embodiments of this invention.

[Drawing 4] is an entire configuration drawing showing the network managing system according to other embodiments of this invention.

[Drawing 5] is a mimetic diagram showing operation of the network managing system according to this embodiment.

[Drawing 6] is a mimetic diagram showing operation of the network managing system according to other embodiments of this invention.

[Description of numerals]

1 Network managing device

1a Performance monitor conditioning part

1b Request packet transmitting part

1c Response packet receiving part
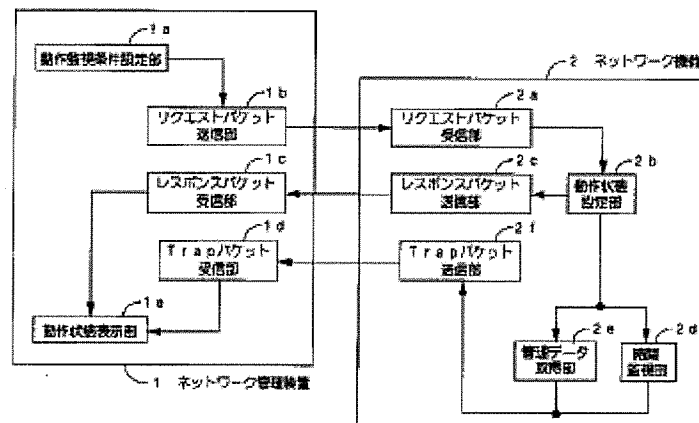
1d Trap packet receiving part

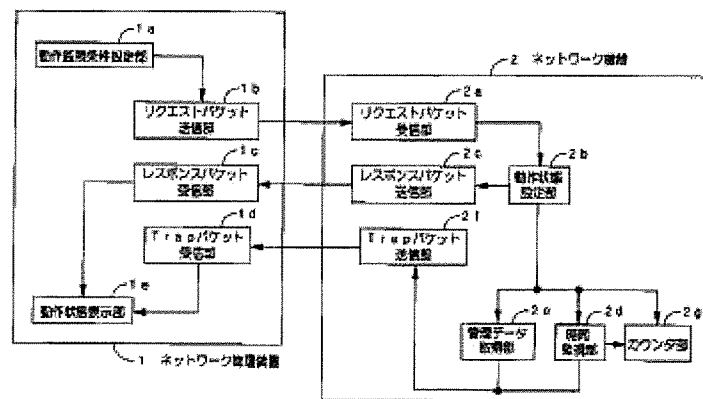1e Operating state indicator

2 Network equipment

2a Request packet receiving part

2b Operating state setting part
2c Response packet transmitting part
2d Time monitoring part
2e Managing data possessing part
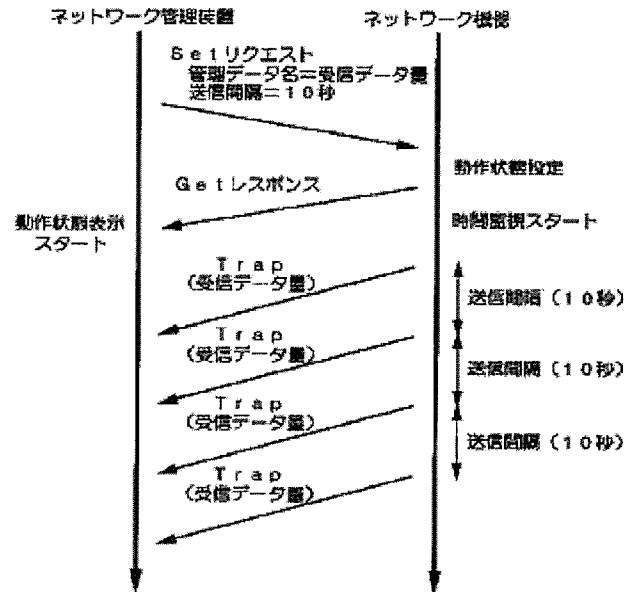2f Trap packet transmitting part
2g Counter part

Drawing 1

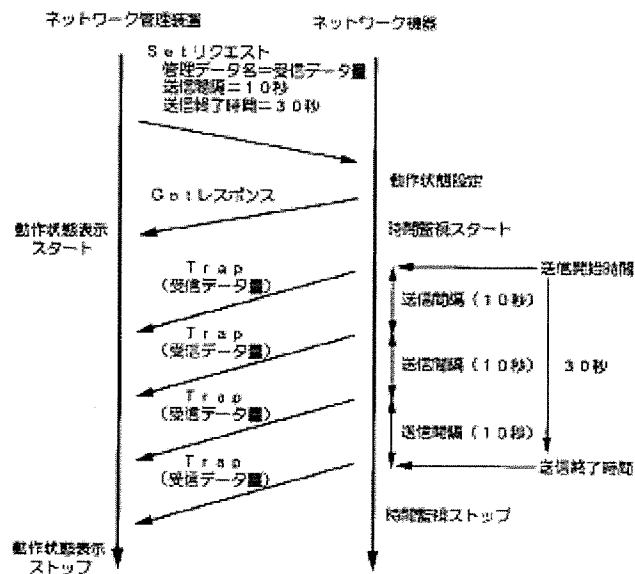## Drawing 4
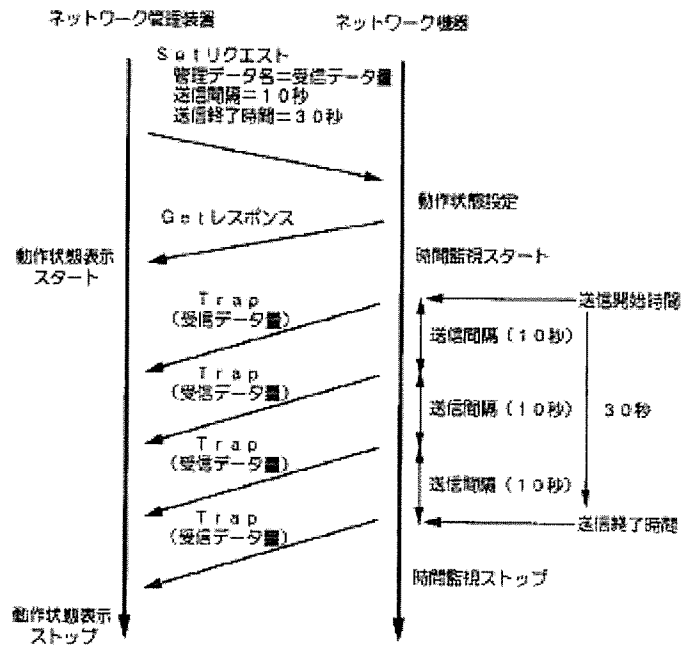
Drawing 2

Drawing 3

Drawing 5

Drawing 6